SUPREME COURT OF THE UNITED STATES

No. 55.—October Term, 1965.

United States, Petitioner, *v.* Bert N. Adams et al.	On Writ of Certiorari to the United States Court of Claims.

[February 21, 1966.]

Mr. Justice Clark delivered the opinion of the Court.

This is a companion case to No. 11, *Graham* v. *John Deere Co.*, decided this day along with Nos. 37 and 43, *Calmar, Inc.* v. *Cook Chemical Co.* and *Colgate-Palmolive Co.* v. *Cook Chemical Co.* The United States seeks review of a judgment of the Court of Claims, holding valid and infringed a patent on a wet battery issued to Adams. This suit under 28 U. S. C. § 1498 was brought by Adams and others holding an interest in the patent against the Government charging both infringement and breach of an implied contract to pay compensation for the use of the invention. The Government challenged the validity of the patent, denied that it had been infringed or that any contract for its use had ever existed. The Trial Commissioner held that the patent was valid and infringed in part but that no contract, express or implied, had been established. The Court of Claims adopted these findings, initially reaching only the patent questions, 330 F. 2d 622, but subsequently, on respondent's motion to amend the judgment, deciding the contract claims as well. No. 163–60, October 16, 1964. The United States sought certiorari on the patent validity issue only. We granted the writ, along with the others, in order to settle the important issues of patentability presented by the four cases. 380 U. S. 949. We affirm.

I.

While this case is controlled on the merits by No. 11, *Graham, supra,* respondents have raised threshold issues as to our jurisdiction which require separate handling. They say that the petition for certiorari came too late, contending that the 90-day period for filing began with the date of the initial judgment rather than the date of the decision on the contract issue, citing *FTC* v. *Minneapolis-Honeywell Co.,* 344 U. S. 206 (1952). We cannot agree; first, because that case did not involve a timely motion to amend the judgment [1] and, secondly, because here the Government's liability was inextricably linked with the alleged contract action which was not determined until the latter judgment.

Nor is there merit in respondents' contention that the Government failed to comply with the requirements of our Rules 21 (1) and 33 as to service, since this requirement was not jurisdictional, no prejudice resulted and the failure was inadvertent.

We turn now to the merits.

II.

The Patent in Issue and Its Background.

The patent under consideration, U. S. No. 2,332,210, was issued in 1943 upon an application filed in December 1941 by Adams. It relates to a nonrechargeable, as opposed to a storage, electrical battery. Stated simply, the battery comprises two electrodes—one made of magnesium, the other of cuprous chloride—which are placed in a container. The electrolyte, or battery fluid, used may be either plain or salt water.

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[1] The time in such cases runs from the date of the order overruling the motion. See *Department of Banking* v. *Pink,* 317 U. S. 264, 267 (1942); *United States* v. *Crescent Amusement Co.,* 323 U. S. 173, 177 (1944); *Forman* v. *United States,* 361 U. S. 416, 426 (1960).

The specifications of the patent state that the object of the invention is to provide constant voltage and current without the use of acids, conventionally employed in storage batteries, and without the generation of dangerous fumes. Another object is "to provide a battery which is relatively light in weight with respect to capacity and in which the battery may be manufactured and distributed to the trade in a dry condition and rendered serviceable by merely filling the container with water." Following the specifications, which also set out a specific embodiment of the invention, there appear 11 claims. Of these, principal reliance has been placed upon Claims 1 and 10, which read:

> "1. A battery comprising a liquid container, a magnesium electropositive electrode inside the container and having an exterior terminal, a fused cuprous chloride electronegative electrode and a terminal connecting with said electronegative electrode.
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> "10. In a battery, the combination of a magnesium electropositive electrode, and an electronegative electrode comprised of cuprous chloride fused with a carbon catalytic agent."

For several years prior to filing his application for the patent, Adams had worked in his home experimenting on the development of a wet battery. He found that when cuprous chloride and magnesium were used as electrodes in an electrolyte of either plain water or salt water that an improved battery resulted.

The Adams invention was the first practical, water-activated, constant potential battery which could be fabricated and stored indefinitely without any fluid in its cells. It was activated within 30 minutes merely by adding water. Once activated, the battery continued to deliver electricity at a voltage which remained essen-

tially constant regardless of the rate at which current was withdrawn. Furthermore, its capacity for generating current was exceptionally large in comparison to its size and weight. The battery was also quite efficient in that substantially its full capacity could be obtained over a wide range of currents. One disadvantage, however, was that once activated the battery could not be shut off; the chemical reactions in the battery continued even though current was not withdrawn. Nevertheless, these chemical reactions were highly exothermic liberating large quantities of heat during operation. As a result, the battery performed with little effect on its voltage or current in very low temperatures. Relatively high temperatures would not damage the battery. Consequently, the battery was operable from 65° Fahrenheit below zero to 200° Fahrenheit. See findings at 330 F. 2d, at 632.

Less than a month after filing for his patent, Adams brought his discovery to the attention of the Army and Navy. Arrangements were quickly made for demonstrations before the experts of the United States Army Signal Corps. The Signal Corps scientists who observed the demonstrations and who conducted further tests themselves did not believe the battery was workable. Almost a year later, in December 1942, Dr. George Vinal, an eminent government expert with the National Bureau of Standards, still expressed doubts. He felt that Adams was making "unusually large claims" for "high watt hour output per unit weight," and he found "far from convincing" the graphical data submitted by the inventor showing the battery's constant voltage and capacity characteristics. He recommended, "Until the inventor can present more convincing data about the performance of his [battery] cell, I see no reason to consider it further."

However, in November 1943, at the height of the war, the Signal Corps concluded that the battery was feasible.

The Government thereafter entered into contracts with various battery companies for its procurement. The battery was found adaptable to many uses. Indeed, by 1956 it was noted that "there can be no doubt that the addition of water-activated batteries to the family of power sources has brought about developments which would otherwise have been technically or economically impossible." See 10th Annual Battery Research and Development Conference, Signal Corps Engineering Laboratories, Fort Monmouth, N. J., 440 (1950). Also, see Finding No. 24, 330 F. 2d, at 632.

Surprisingly, the Government did not notify Adams of its changed views nor of the use to which it was putting his device, despite his repeated requests. In 1955, upon examination of a battery produced for the Government by the Burgess Company, he first learned of the Government's action. His request for compensation was denied in 1960, resulting in this suit.

III.

The Prior Art.

The basic idea of chemical generation of electricity is, of course, quite old. Batteries trace back to the epoch discovery by the Italian scientist Volta in 1795, who found that when two dissimilar metals are placed in an electrically conductive fluid an electromotive force is set up and electricity generated. Essentially, the basic elements of a chemical battery are a pair of electrodes of different electrochemical properties and an electrolyte which is either a liquid (in "wet" batteries) or a moist paste of various substances (in the so-called "dry-cell" batteries). Various materials which may be employed as electrodes, various electrolyte possibilities and many combinations of these elements have been the object of considerable experiment for almost 175 years. See generally, Vinal, Primary Batteries (New York 1950).

At trial, the Government introduced in evidence 24 patents and treatises as representing the art as it stood

in 1938, the time of the Adams invention.[2] Here, however, the Government has relied primarily upon only six of these references [3] which we may summarize as follows.

The Niaudet treatise describes the Marie-Davy cell invented in 1860 and De La Rue's variations on it. The battery comprises a zinc anode and a silver chloride cathode. Although it seems to have been capable of working in an electrolyte of pure water, Niaudet says the battery was of "little interest" until De La Rue used a solution of ammonium chloride as an electrolye. Niaudet also states that "the capital advantage of this battery, as in all where zinc with sal ammoniac [ammonium chloride solution] is used, consists in the absence of any local or internal action, as long as the electric circuit is open; in other words, this battery does not work upon itself." Hayes likewise discloses the De La Rue zinc-silver chloride cell, but with certain mechanical differences designed to restrict the battery from continuing to act upon itself.

The Wood patent is relied upon by the Government as teaching the substitution of magnesium, as in the Adams patent, for zinc. Wood's patent, issued in 1925, states: "It would seem that a relatively high voltage primary cell would be obtained by using . . . magnesium as the . . . [positive] . . . electrode and I am aware that attempts have been made to develop such a cell. As far as I am aware, however, these have all been unsuccessful, and it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode."

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[2] The references are listed in the opinion of the Court of Claims, 330 F. 2d, at 631.

[3] Niaudet, Elementary Treatise on Electric Batteries (Fishback translation 1880); Hayes U. S. Patent No. 282,634 (1883); Wood U. S. Patent No. 1,696,873 (1928); Codd, Practical Primary Cells (London 1929); Wensky British Patent No. 49 of 1891; and Skrivanoff British Patent No. 4,341 (1880).

Wood recognized that the difficulty with magnesium electrodes is their susceptibility to chemical corrosion by the action of acid or ammonium chloride electrolytes. Wood's solution to this problem was to use a "neutral electrolyte containing a strong oxidizing agent adapted to reduce the rate of corrosion of the magnesium on open circuit." There is no indication of its use with cuprous chloride, nor was there any indication that a magnesium battery could be water-activated.

The Codd treatise is also cited as authority for the substitution of magnesium. However, Codd simply lists magnesium in an electromotive series table, a tabulation of electrochemical substances in descending order of their relative electropositivity. He also refers to magnesium in an example designed to show that various substances are more electropositive than others, but the discussion involves a cell containing an acid which would destroy magnesium within minutes. In short, Codd indicates, by inference, only that magnesium is a theoretically desirable electrode by virtue of its highly electropositive character. He does not teach that magnesium could be combined in a water-activated battery or that a battery using magnesium would have the properties of the Adams device. Nor does he suggest, as the Government indicates, that cuprous chloride could be substituted for silver chloride. He merely refers to the cuprous *ion*—a generic term which includes an infinite number of copper compounds—and in no way suggests that cuprous chloride could be employed in a battery.

The Government then cites the Wensky patent which was issued in Great Britain in 1891. The patent relates to the use of cuprous chloride as a depolarizing agent. The specifications of his patent disclose a battery comprised of zinc and copper electrodes, the cuprous chloride being added as a salt in an electrolyte solution containing zinc chloride as well. While Wensky recognized that

cuprous chloride could be used in a constant current cell, there is no indication that he taught a water-activated system or that magnesium could be incorporated in his battery.

Finally, the Skrivanoff patent depended upon by the Government relates to a battery designed to give intermittent, as opposed to continuous service. While the patent claims magnesium as an electrode, it specifies that the electrolyte to be used in conjunction with it must be a solution of "alcoline, chlorochromate, or a permanganate strengthened with sulphuric acid." The cathode was a copper or carbon electrode faced with a paste of "phosphoric acid, amorphous phosphorous, metallic copper in spangles, and cuprous chloride." This paste is to be mixed with hot sulfuric acid before applying to the electrode. The Government's expert testified in trial that he had no information as to whether the cathode, as placed in the battery, would, after having been mixed with the other chemicals prescribed, actually contain cuprous chloride. Furthermore, respondents' expert testified, without contradiction, that he had attempted to assemble a battery made in accordance with Skrivanoff's teachings, but was met first with a fire when he sought to make the cathode, and then with an explosion when he attempted to assemble the complete battery.

IV.

The Validity of the Patent.

The Government challenges the validity of the Adams patent on grounds of lack of novelty under 35 U. S. C. § 102 (a) as well as obviousness under 35 U. S. C. § 103. As we have seen in *Graham* v. *John Deere*, — U. S. —, —, novelty and nonobviousness—as well as utility—are separate tests of patentability and all must be satisfied in a valid patent.

The Government concludes that wet batteries comprising a zinc anode and silver chloride cathode are old

in the art; and that the prior art shows that magnesium may be substituted for zinc and cuprous chloride for silver chloride. Hence, it argues that the "combination of magnesium and cuprous chloride in the Adams battery was not patentable because it represented either no change or an insignificant change as compared to the prior art battery designs." And, despite "the fact that wholly unexpectedly, the battery showed certain valuable advantages over other batteries would not justify a patent on the essentially old formula."

There are several basic errors in the Government's position. First, the fact that the Adams battery is water-activated sets his device apart from the prior art. It is true that Claims 1 and 10, *supra*, do not mention a water electrolyte, but, as we have noted, a stated object of the invention was to provide a battery rendered serviceable by the mere addition of water. While the claims of a patent limit the invention, and specifications cannot be utilized to expand the patent monopoly, *Burns* v. *Meyer*, 100 U. S. 671, 672 (1879); *McCarty* v. *Lehigh Valley R. Co.*, 160 U. S. 110, 116 (1895), it is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention, *Seymour* v. *Osborne*, 11 Wall. 516, 547 (1870); *Schriber-Schroth Co.* v. *Cleveland Trust Co.*, 311 U. S. 211 (1940); *Schering Corp.* v. *Gilbert*, 153 F. 2d 428 (1926). Taken together with the stated object of disclosing a water-activated cell, the lack of reference to any electrolyte in Claims 1 and 10 indicates that water alone could be used. Furthermore, of the 11 claims in issue, three of the narrower ones include references to specific electrolyte solutions comprising water and certain salts. The obvious implication from the absence of any mention of an electrolyte—a necessary element in any battery—in the other eight claims reinforces this conclusion. It is evident that respondents' present reli-

ance upon this feature was not the after-thought of an astute patent trial lawyer. In his first contact with the Government less than a month after the patent application was filed, Adams pointed out that "no acids, alkaline or any other liquid other than plain water is used in this cell. Water does not have to be distilled . . . ." Letter to Charles F. Kettering (January 7, 1942), R., p. 415. Also see his letter to the Department of Commerce (March 28, 1942), R., p. 423. The findings, approved and adopted by the Court of Claims, also fully support this conclusion.

Nor is *Sinclair & Carroll Co.* v. *Interchemical Corp.*, 325 U. S. 327 (1945), apposite here. There the patentee had developed a rapidly drying printing ink. All that was needed to produce such an ink was a solvent which evaporated quickly upon heating. Knowing that the boiling point of a solvent is an indication of its rate of evaporation, the patentee merely made selections from a list of solvents and their boiling points. This was no more than "selecting the last piece to put in the last opening of a jigsaw puzzle." 325 U. S., at 335. Indeed, the Government's reliance upon *Sinclair & Carroll* points up the fallacy of the underlying premise of its case. The solvent in *Sinclair & Carroll* had no functional relation to the printing ink involved. It served only as an inert carrier. The choice of solvent was dictated by known, required properties. Here, however, the Adams battery is shown to embrace elements having an interdependent functional relationship. It begs the question, and overlooks the holding of the Commissioner and the Court of Claims, to state merely that magnesium and cuprous chloride were individually known battery components. If such a combination is novel, the issue is whether bringing them together as taught by Adams was obvious in the light of the prior art.

We believe that the Court of Claims was correct in concluding that the Adams battery is novel. Skrivanoff disclosed the use of magnesium in an electrolyte completely different from that used in Adams. As we have mentioned, it is even open to doubt whether cuprous chloride was a functional element in Skrivanoff. In view of the unchallenged testimony that the Skrivanoff formulation was both dangerous and inoperable, it seems anomalous to suggest that it is an anticipation of Adams. An inoperable invention or one which fails to achieve its intended result does not negative novelty. *Smith* v. *Snow*, 294 U. S. 1, 17 (1934). That in 1880 Skrivanoff may have been able to convince a foreign patent examiner to issue a patent on his device has little significance in the light of the foregoing.

Nor is the Government's contention that the electrodes of Adams were mere substitutions of pre-existing battery designs supported by the prior art. If the use of magnesium for zinc and cuprous chloride for silver chloride were merely equivalent substitutions, it would follow that the resulting device—Adams'—would have equivalent operating characteristics. But it does not. The court below found, and the Government apparently admits, that the Adams battery "wholly unexpectedly" has shown "certain valuable advantages over other batteries" while those from whom it is claimed to have been copies were long ago discarded. Moreover, most of the batteries relied upon by the Government were of a completely different type designed to give intermittent power and characterized by an absence of internal action when not in use. Some provided current at voltages which declined fairly proportionately with time.[4] Others were

[4] It is interesting to note in this connection that in testing the Adams cell the Signal Corps compared it against batteries of this type. The graphical results of the comparison are shown in respondent's brief, p. 51.

so-called standard cells which, though producing a constant voltage, were of use principally for calibration or measurement purposes. Such cells cannot be used as sources of power.[5] For these reasons we find no equivalency.[6]

We conclude the Adams battery was also nonobvious. As we have seen, the operating characteristics of the Adams battery have been shown to have been unexpected and to have far surpassed then-existing wet batteries. Despite the fact that each of the elements of the Adams battery was well known in the prior art, to combine them together as did Adams required that a person reasonably skilled in the prior art must ignore that (1) batteries which continued to operate on an open circuit and which heated in normal use were not practical; and (2) water-activated batteries were successful only when combined with electrolytes detrimental to the use of magnesium. These long-accepted factors, when taken together, would, we believe, deter any investigation into such a combination as is used by Adams. This is not to say that one who merely finds new uses for old inventions by shutting his eyes to their prior disadvantages thereby discovers a patentable innovation. We do say, however, that known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining obviousness.

Nor are these the only factors bearing on the question of obviousness. We have seen that at the time Adams

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[5] The standard text in the art states: "The best answer to the oft-repeated question: 'How much current can I draw from my standard cell?' is 'None.'" Vinal, Primary Batteries, p. 212 (New York 1950); see also Reuben U. S. Patent No. 1,696,873 (1928).

[6] In their motion to dismiss the writ of certiorari as improvidently granted, respondents asserted that the Government was estopped to claim equivalency of cuprous chloride and silver chloride. We find no merit in this contention and, therefore, deny the motion.

perfected his invention noted experts expressed disbelief in it. Several of the same experts subsequently recognized the significance of the Adams invention, some even patenting improvements on the same system. Fischbach et al., U. S. Patent No. 2,636,060 (1953). Furthermore, in a crowded art replete with a century and a half of advancement, the Patent Office found not one reference to cite against the Adams application. Against the subsequently issued improvement patents to Fischbach, *supra*, and to Chubb, U. S. Reissue Patent No. 23,883 (1954), it found but three references prior to Adams—none of which are relied upon by the Government.

We conclude that the Adams patent is valid. The judgment of the Court of Claims is affirmed.

It is so ordered.

MR. JUSTICE WHITE dissents.

MR. JUSTICE FORTAS took no part in the consideration or decision of this case.